Need/Opportunity Title: Improved Detection and Characterization of Radioactive Contamination on Large Concrete and Metal Surfaces
Need/Opportunity ID No: NV10-0001-10
Date:
Need/Opportunity Description: A cheaper, faster, and/or safer method for characterizing radioactive contamination on large concrete and metal surfaces is desirable. At present, detecting and characterizing radioactive contamination using alpha meters is extremely time and labor intensive. The technology would support the Accelerating Cleanup: Paths to Closure (ACPC) for decontamination and decommissioning (D&D). Six facilities are planned for D&D at the Nevada Test Site (NTS) as well as other DOE sites.
Need/Opportunity Category: Technology Need
Science Need Description: The efficiency of contamination characterization technologies is dependent upon the depth of penetration of the contaminant and the chemical species of the contaminant. Fundamental studies are required on the chemical mechanisms of fate (adsorption-desorption) and transport of contaminant species in concrete. Results from these studies would be used to develop and test methods for detecting surface contamination and developing remediation technologies.
Operations/Field Office: DOE/NV
Site: NTS
End User Program: Environmental Restoration Division (ERD)
Priority Rankings:
End User Program Ranking: 1 of 5
ACPC Priority: 3
Site Wide Ranking: 9 of 13
PBS Number/Title: NV214/Industrial Sites
WBS Number: 1.4.1.2.1.3.12
Waste Stream: LLW D&D Rubble and Liquid (01025)
Background: Characterizing radioactive contamination on the walls and surfaces of buildings and equipment using instruments held inches from the walls and surfaces is extremely time and labor intensive. Working from scaffolding, man lifts, etc., may result in accidents.
"Baseline" Technology/Process: Instruments held inches from a wall or surface.
Cost: The cost estimate for field labor is about $2.5 million in present day dollars.
How Long Will it Take: From 2002 to 2007.
Issues Related to Baseline:
Technical: The baseline alternative is extremely time and labor intensive.
Cost: The cost savings for field characterization is estimated to be on the order of less than $0.5 million in present day dollars.
Regulatory: Not Applicable in Characterization Phase.
Safety, Health, and the Environment: Remote sensing and data collection would reduce the risk of exposure of characterization workers to radiation.
Stakeholder and Cultural: D&D at the NTS is of general concern to the stakeholders.
Other: Some D&D facilities are being evaluated as resources which could be decontaminated

and may be made available to commercial business at the NTS.

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Functional Performance Requirements: The requirements for this need include a portable system, remote detection and characterization, and real time visual display. The radioisotopes of primary concern are cobalt, cesium, plutonium, and uranium; however, the needed technology could involve only gross alpha and beta counting. Portability is crucial as a reduction in overall man-hours necessary to characterize surfaces is the primary objective of cost-savings and decreased safety concerns. Needed technology must work equally well on flat smooth surfaces and surfaces with cracks, joints, and crevices. Additionally, the technology should incorporate real time data collection and have a direct downloading capability. Furthermore, the system should be able to link gross alpha and beta counts to a grid system adaptable to any size surface. Cost reduction should be at least 35 percent of existing technologies.

Schedule Requirements: D&D is scheduled to occur at six NTS facilities before FY 2007.

Consequences of Not Filling Need/Opportunity: Potentially more time-consuming, expensive, and potentially less safe methods for detecting and characterizing contamination will continue to be used.

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